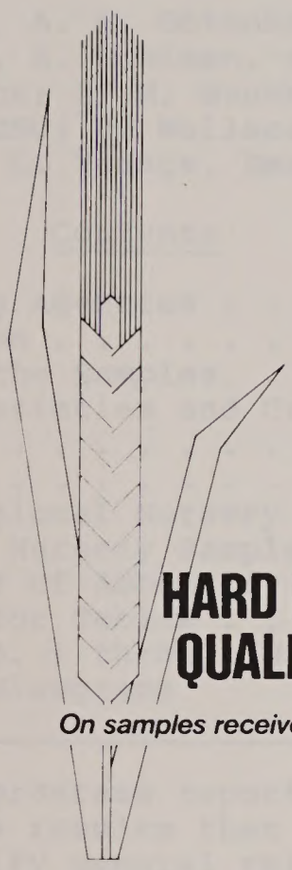
1985 CROP

HARD RED SPRING QUALITY REPORT

Physical, Chemical, Milling, and Baking Characteristics

United States Department of Agriculture
Agricultural Research Service
North Central Region



HARD RED SPRING QUALITY REPORT

On samples received from the 1985 crop

Source:

Spring and Durum Wheat Quality Laboratory
USDA, Agricultural Research Service
Harris Hall, N.D.S.U.
Fargo, North Dakota 58105

REPORT OF PHYSICAL, CHEMICAL, MILLING AND BAKING EXPERIMENTS WITH HARD RED SPRING WHEAT

1985 CROP1/

by

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Contents

1/ This is a progress report of cooperative investigations containing some results that have not been sufficiently confirmed to justify general release; interpretations may be modified with additional experimentation. Confirmed results will be published through established channels. Cooperators submitting samples for analysis have been given analytical data on their samples prior to release of this report. The report is primarily a tool for use of cooperators and their official staffs and to those persons having direct and special interest in the development of agricultural research programs.

This report was compiled by the Agricultural Research Service, U. S. Department of Agriculture. Special acknowledgment is made to the North Dakota State University for their facilities and services provided in support of these studies. The report is not intended for publication and should not be referred to in literature citations nor quoted in publicity or advertising. Use of the data may be granted for certain purposes upon written request to the agency or agencies involved.

2/ Hard Red Spring & Durum Wheat Quality Lab., NDSU.
3/ Dept. of Cereal Science & Food Technology, NDSU.

1985 COOPERATING AGENCIES AND STATIONS

The cooperative agencies and stations conducting the varietal plot and nursery experiments from which the 1985 spring wheat samples were received are listed below:

Arizona Agricultural Experiment Station:

Mesa

University of California, Davis:

El Centro

Minnesota Agricultural Experiment Station:

St. Paul, North area, South area, Crookston, Morris

Montana Agricultural Experiment Station:

Sidney, Bozeman, Havre

North Dakota Agricultural Experiment Station:

Fargo, Minot, Langdon, Dickinson, Carrington Irr., Williston

South Dakota Agricultural Experiment Station:

Groton, Highmore, Selby, N.E. Farm, Brookings, Redfield

Idaho Agricultural Experiment Station:

Aberdeen, Tetonia

Wyoming Agricultural Experiment Station:

Sheridan

Washington Agricultural Experiment Station:

Pullman

Wisconsin Agricultural Experiment Station:

Madison

A complete list of all cooperating agencies, stations, and personnel for the year will be found in the report by R. H. Busch, et al., Wheat Varieties Grown in Cooperative Plot and Nursery Experiments in the Spring Wheat Region in 1985.4/

4/ Busch, R. H. Wheat Varieties Grown in Cooperative Plot and Nursery Experiments in the Spring Wheat Region in 1985. Agricultural Research Service, U. S. Department of Agriculture and State Agricultural Experiment Station, St. Paul, MN.

INTRODUCTION

Samples of standard varieties and many of the new strains of hard red spring wheat grown in cooperative experiments in the spring wheat region of the United States4/ are milled each year by the USDA. The flours are assayed chemically and physically and baked into bread to determine the quality characteristics. The purpose of this report is to make available to the cooperators and other interested parties, quality data on the standard varieties and new strains of hard red spring wheat from the 1985 crop.

The same general format and techniques were used in evaluating the wheat as outlined in quality reports for previous years. The same computer scoring system has been used for the past four years, hence some faulting values differ slightly from previous years. In general, data contained in this report are comparable to data in past reports and, where applicable, average results and also the average results of other crop years are compared. The area averages are tabulated for the Uniform Regional Nursery varieties of Butte, Era, Chris and Waldron. A five-year average (5-YA) and the averages for the individual five years include all selections grown in the Uniform Regional Nurseries for that year. These results give an overview of individual years and the influence of environment on the crop. The actual crop characteristics may be somewhat different due to differences in varieties, but the change from year to year is applicable.

The evaluation of a sample involves three areas of analysis: kernel characteristics, milling performance and baking evaluation. A brief description of the methods is given on pages 9 to 11 of this report. It is possible to deduce the various characteristics of the selection and any outstanding features or deficiencies which are apparent. No specific comments are made regarding the mixogram patterns, since reference mixograms for each of the general types are presented at the end of the report.

Seeding for the 1985 crop over the spring wheat area started the week of April 8 in the southern half of the state. The rest of the state started seeding the week of April 14.

The average flour extraction was 0.7% higher than the 1984 crop and also 0.7% higher than the 5-year average.

Wheat mineral content was lower than the 1984 crop and also lower than the 5-year average. The wheat protein content was 0.3% higher than the 1984 crop but 0.3% lower than the 5-year average. The physical characteristics of the wheat were somewhat better than both the 1984 crop and the 5-year average. Bake absorption was 0.9% higher than the 1984 crop but 0.3% lower than the 5-year average. Mix time was slightly shorter than both the 1984 crop and the 5-year average. The loaf volume was slightly higher than the 1984 crop but slightly lower than the 5-year average. Oxidation requirements were the same.

SOURCE OF THE 1985 CROP SAMPLES

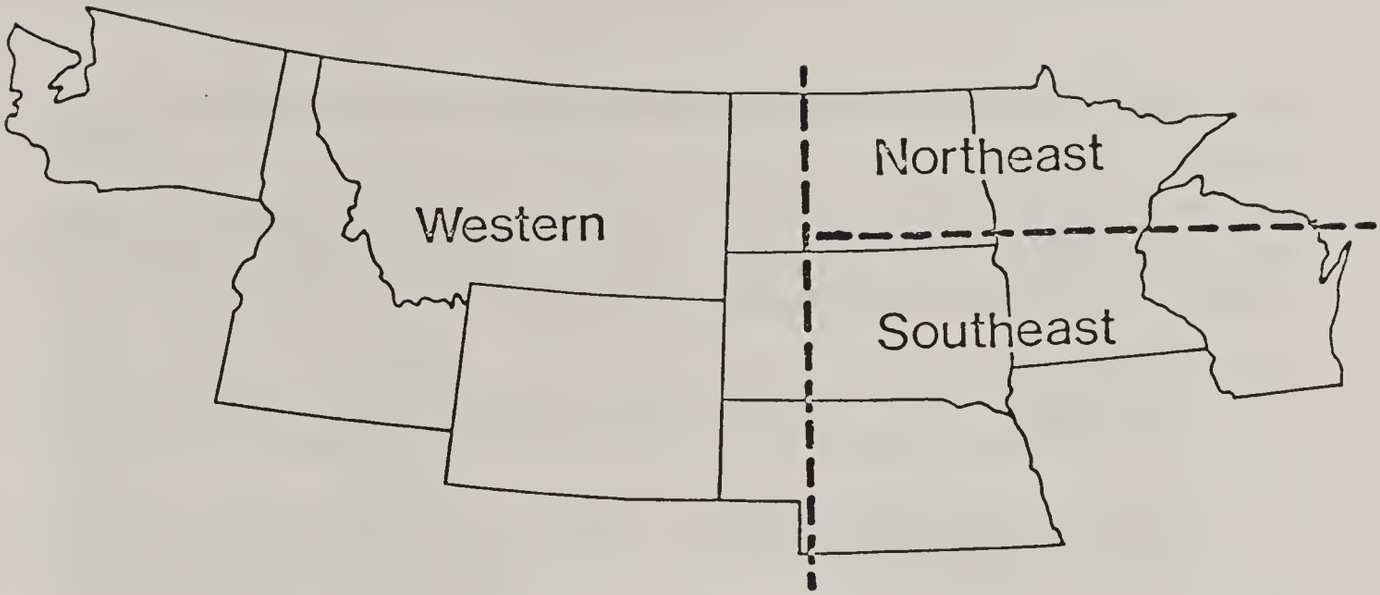
Tests were performed on 1,579 samples. However, data on 939 of these are not included in this report, because this information was of interest to plant breeders at specific experiment stations only. Data presented in this report are from the Field Plot Nursery and the Uniform Regional Nursery. The samples came from 27 stations in 10 states shown below:

Arizona: Mesa
California: El Centro
Idaho: Aberdeen and Tetonia
Minnesota: Crookston, Morris, St. Paul, North area, South area
Montana: Sidney, Havre and Bozeman
North Dakota: Fargo, Minot, Langdon, Dickinson, Carrington Irr., Williston
South Dakota: Brookings, Selby, Redfield, Groton, Highmore, N.E. Farm
Washington: Pullman
Wisconsin: Madison
Wyoming: Sheridan

On page 8 are listed the spring wheats that were included in the Uniform Regional Nursery trials. The variety or cross, the station that developed the variety, the state selection number and the C.I. number also are given.

BLENDING AND AVERAGING PROCEDURES USED

Individual wheat samples from the Uniform Regional Nursery originating from the three geographical areas shown in the illustration on page 7 were blended according to area. All but one of the 27 stations were compatible for blending. (The results from that station are included as individual data.) Milling performance, mixograms and baking data were obtained from these area blends. However, data for kernel characteristics are arithmetical averages of individual sample analyses. These data from the Uniform Regional Nursery also are compared with averages from the previous four years (Table 1).



Wheat blends were made according to the geographical areas shown above.

Data for the Field Plot Nursery are on the individual samples.

THE UNIFORM REGIONAL HARD RED SPRING WHEAT PERFORMANCE NURSERY

The 30 entries in the 1985 URHRSWPN are listed below:

Entry No.	Cross or Variety	CI No. or Selection No.	Year Entered	Source
1.	Marquis	3561	1929	Canada
2.	Chris	13751	1969	USDA-MN
3.	Waldron	13958	1964	ND
4.	Era	13986**	1972	USDA-MN
5.	Butte	17681	1979	ND
6.	Butte/CO53427//WS1809	SD2956**	1984	SD
7.	SD2256/Wheaton	SD2968**	1984	SD
8.	Butte*2/Arthur 71	SD8036	1984	SD
9.	Coteau/Dawn	SD8026	1983	SD
10.	SD2827/3/Burgas 2--/4/CNO	SD2962	1985	SD
11.	PI015838/Marberg	MT8218**	1985	USDA-MT
12.	PM23/MT 7448	MT8320**	1985	USDA-MT
13.	PM23/MT 7448	MT8328**	1985	USDA-MT
14.	Polk/3/Era/Tob//Lou 11	MN80056**	1984	USDA-MN
15.	MN7528/Wheaton	MN82128**	1984	USDA-MN
16.	MN7528/Butte	MN82047**	1985	USDA-MN
17.	Butte*2/3/ND551//Butte*2/ND507	ND597	1983	ND
18.	Len//Butte/ND526	ND604**	1984	ND
19.	Lew//Tioga*3/FO629/3/Tioga/RL6043	ND600**	1985	ND
20.	Su28-1*2/3/Lew//Tioga*2/RL6043	ND606	1985	ND
21.	ND517-2/3/Olaf//Waldron*2/Agent	ND616**	1985	ND
22.	Borah*2/Bluebird 'S' resel.	ID6291	1985	USDA-ID
23.		RH841246	1985	Rohm-Haas
24.	Webster/Era//MN7125	NAHS82-175**	1985	NAPB
25.	Marshall/Len	NAHS82-288**	1985	NAPB
26.	Angus/Len	NAHS81-55**	1984	NAPB
27.	Waldron/2*Era	NAH81-12**	1985	NAPB
28.	K73579/Borah	WA 7075**	1984	WA
29.	K74153/K74093	WA 7182**	1984	WA
30.	K7205061/WA7184	WA 7185**	1984	WA

** Semidwarf

METHODS

The terminology and methods used are briefly described below:

Test Weight Per Bushel - The weight per Winchester bushel of cleaned, dry, scoured wheat. To determine the dockage-free test weight on a comparable sample, approximately one pound per bushel should be subtracted from the value given.

1000 Kernel Weight - The 1000 kernel weight was determined by counting with a Seedburo seed counter the number of kernels in a 10 g sample of cleaned, picked wheat5/.

Kernel Size - The percentages of the size of the kernels (large, medium and small) were determined on a wheat sizer as described by Shuey6/.

The sieves of the sizer were clothed as follows:

Top Sieve - Tyler #7 with 2.92 mm opening
Middle Sieve - Tyler #9 with 2.24 mm opening
Bottom Sieve - Tyler #12 with 1.65 mm opening

Potential Milling Yield - The potential yield is not shown on the computer tables, but it can be determined by multiplying the percentages of the overs of each sieve #7, #9 and #12 by the value of 78%, 73% and 68%, respectively. The accumulation percentage would be the potential yield.

Milling - The samples were cleaned by passing the wheat over an Emerson kicker and dockage tester and through a modified Forster scourer (Model 6). The clean, dry samples were pretempered to 12% moisture for at least 72 hours; then tempered to 16% moisture and allowed to stand overnight prior to milling.

5/ Mention of a trademark name or a proprietary product does not constitute a guarantee or warranty of the product by the U. S. Department of Agriculture, and does not imply its approval to the exclusion of other products that may also be suitable.

6/ Shuey, William C. A Wheat Sizing Technique for Predicting Flour Milling Yield. Cereal Science Today 5:71-72,75 (1960).

The Special Uniform Nursery Spring Wheat samples were milled on a Brabender Quadrumat Jr. mill. The mill was equipped with a #18 wire on the drum sieve. The throughs of the #18 wire were rebolted on a Strand sifter equipped with a #60 Tyler sieve. The sample was sifted for 1 minute. The throughs of the #60 wire classified as flour, and this was the material tested. The overs of the #18 wire were classified as bran, and the overs of the #60 Tyler sieve as crude shorts.

The Uniform Regional Nursery blends and the Field Plot Nursery samples were milled on a Buhler continuous experimental mill. This mill has been slightly modified to give results more comparable to commercial milling. The break scalping sieves were clothed with #54 stainless steel wire, the reduction scalping sieves with #58, #66 and #105 stainless steel wire for the first, second and third reduction, respectively. All of the flour sieves were clothed with #135 stainless steel wire.

All six flour streams were combined to give the patent flour. The extraction of a good milling wheat using this flow is approximately 68%. This is comparable to a commercial "long patent" extraction flour. At this flour extraction of the wheat, the changes in flour ash are most sensitive to changes in percent extraction.

Protein Content - Both the Kjeldahl procedure and the near infrared technique were used to determine protein content. Nitrogen values, as determined by the Kjeldahl procedure, were multiplied by 5.7 to calculate protein values.

Mineral Content or Ash Content - This was determined by measuring the residue of the minerals left after incinerating the sample for approximately 16 hours at 565°C. The results were reported as percentage of the sample weight.

Mixogram - The mixogram was determined by using 30 g of flour and adding 20 cc of water. The sensitivity spring setting was set at 10. All mixograms were run with constant weight of flour and volume of water. Absorptions reported were adjusted according to the height of the mixogram. The correction factor was determined from a series of flours by varying the amount of absorption.

Mixogram Pattern - The reference mixogram patterns given at the end of the report demonstrate the different types of mixograms that were obtained. A single number is assigned each pattern to characterize and simplify the classification of the curves--the larger number indicating stronger curve characteristics.

Baking Procedure or Formula - The baking formula used was as follows:

100% flour	3% milk D.S.M.
2% salt	3% yeast
5% sugar	2% shortening (Crisco, melted)

The samples were mixed to development in National Manufacturing mixers: the micro mixer for the 25 g samples and the 100 g special mixer for the 100 g samples. Bromate (7.5 ppm) for oxidation and barley malt flour (0.04%) for enzymatic supplement were added to each sample. All doughs were moulded in a Roll-Er-Up moulder.

Absorption - The amount of water, expressed as percent of the flour, required to bring the dough to proper consistency.

Crumb Color - A value was determined by comparing the loaf of the tested sample against a baking standard. This standard was an equal blend of the variety Len grown at Casselton and Minot, ND, Redfield, SD and Crookston, MN.

Loaf Volume - The volume of the baked loaf as determined by seed displacement.

All values (protein, ash and absorption) were reported on a 14% moisture basis.

DISCUSSION

The following discussion presents some of the basic techniques and criteria used in the milling and baking quality evaluation of the samples. There are three major evaluation categories used: kernel characteristics, to characterize the kernel; milling performance, to evaluate the general milling characteristics; baking score, to evaluate the flour as to type and overall baking quality.

Each evaluation category can be important. A sample could be of a sufficiently poor quality for a given category to suggest elimination from future testing. However, a sample submitted for the first time and found to be questionable should be tested again to establish if it has a satisfactory or unsatisfactory classification. A sample which is consistently rated as questionable should be discarded.

Five characteristics (test weight, 1000 kernel weight, percent small kernels, wheat mineral and wheat protein) were independent variables used to calculate the dependent variable - wheat score. Four characteristics (percent extraction, mineral @ 65% extraction, flour protein and milling character) were used to calculate the dependent variable - mill score. Seven characteristics (mixogram pattern, bake absorption, mixing time, dough characteristics, crumb color, crumb grain and loaf volume) were used to calculate the dependent variable - bake score. These three dependent variables after calculation become independent variables used to calculate the dependent variable - general evaluation.

This is the fourth year our current computer program has been used, which was designed and implemented to handle the analysis and tabulation for the data from each station. This program uses the Statistical Analysis Systems (SAS Institute, Inc., SAS Circle, Box 8000, Cary, NC 27511).7/

The samples are tested and data collected on 17 quality factors or variables. The program then grades each factor against predetermined faulting values and assigns major (MJ) or minor (MI) faults where applicable. The data is then broken down into 3 major areas of concern to relate more directly to agronomic, industrial and consumer requirements. Each sample is assigned a score of 4 in the areas of Wheat Characteristics, Milling Characteristics and Baking Characteristics. The program then adjusts the score (4 = Good promise, 3 = Some promise, 2 = Little promise, 1 = No promise) depending upon the number of major and/or minor faults assigned to that sample.

7/ Nolte, L.L., Youngs, V.L., Crawford, R.D., and Kunerth, W.H. 1985. Computer program evaluation of hard red spring wheat. Cereal Foods World 30:227-229.

A general score is also given to each sample. This score is again 1-4 and is obtained by calculating the mean of the other 3 scores.

The following tables list the variables used in each scoring area and their specific faulting and scoring values.

WHEAT SCORE

Variables Included	Faulting Limits Minor	Faulting Limits Major	Effect on Score Minor	Effect on Score Major
Test Weight (#/bu)	57.9	56.9	-	-1
1000 Kernel Weight[a] (g)	Mean-2.1	Mean-5.1	-	-1
Small Kernels (%)	8	16	-	-1
Wheat Mineral (%)	1.71	1.81	-	-
Wheat Protein (%)	13.9	12.9	-1	-2

[a] The mean, or average, is calculated using the data from the standards tested with that station.

MILL SCORE

Variables Included	Faulting Limits Minor	Faulting Limits Major	Effect on Score Minor	Effect on Score Major
Flour Extraction[a] (%)	Mean-2.1	Mean-4.1	-1	-2
Flr. Mineral @ 65% Ex.[b]				
Large Samples	.47	.51	-	-1
Small Samples	.57	.61	-	-1
Flour Protein (%)	12.9	12.4	-1	-2
Milling Character[c]	3	2	-1	-2

[a] The mean, or average, is calculated using the standards tested with that station.

[b] The large samples are milled on a Buhler experimental mill, and the small samples are milled on a Quadrumat Jr. experimental mill. Different values are used to compensate for the difference in the efficiency of the two mills and their respective procedures.

[c] 5 = Normal. 4 = Normal-soft. 3 = Soft-normal. 2 = Soft. 1 = Gritty. 0 = Very soft.

BAKE SCORE

Variables Included		Faulting Limits Minor	Faulting Limits Major	Effect on Score Minor	Effect on Score Major
Mixogram Pattern[a]		2,7 or 8	1,or 9-11	-	-1
Bake Absorption (%)		61.9	60.4	-1	-2
Mix Time (min.)		5.75-8.00 or 2.00-2.75	0-1.75 or over 8.00	-1 -1	-2 -2
Dough Characteristic[b]		6,5	4 or less	-	-2
Crumb Color[c]		6-4	3 or less	-	-1
Crumb Grain[d]		7-4	3 or less	-	-1
Loaf Volume[e] (cc)	Lg.	Mean-55	Mean-105	-1	-2
	Sm.	Mean-21	Mean-31	-1	-2

[a] Refer to reference mixograms for numerical curve pattern. (1 = very weak--11 = very strong)

[b] 9 = Elastic. 8 = Slightly elastic. 7 = Slightly pliable. 6 = Pliable. 5 = Very pliable. 4 = Very elastic. 3 = Bucky. 2 = Very, very pliable. 1 = Extremely pliable. 0 = Dead.

[c] The column headed Crumb Color on the data tables has two scores. The first score is the brightness, or sheen, of the grain as compared to the standard(s). (Standard = 100.) The second score is a single digit indicating the color of the interior of the loaf. 9 = Bright white. 8 = White. 7 = Normal. 6 = Slightly creamy. 5 = Bright creamy. 4 = Creamy. 3 = Very creamy. 2 = Gray. 1 = Very gray. 0 = Dull.

[d] The column on the data tables headed Crumb Grain also has two scores. The first score is a numerical comparison against the standard(s). The second score indicates the structure of the grain. 12 = Normal. 11 = Slightly irregular. 10 = Slightly open. 9 = Slightly irregular and open. 8 = Slightly open and irregular. 7 = Irregular. 6 = Open. 5 = Irregular and slightly open. 4 = Open and slightly irregular. 3 = Irregular and open. 2 = Open and irregular. 1 = Harsh. 0 = Soggy.

[e] The mean, or average, is calculated using the standards tested with that station. "Lg." refers to the faulting and scoring values for 100 g. loaves. "Sm." refers to the faulting and scoring values for 25 g. (pup) loaves.

All samples, as in previous years, are compared with a milling and baking standard that represents a blend of the crop year blended to a known quality. However, the samples for the individual stations are evaluated against the average results of the check varieties from the respective stations. The agronomic and climatic conditions of the individual locations can affect the quality of the wheat sample, such that the evaluation at certain locations could have all samples--even the named varieties--classified as questionable to unsatisfactory. Therefore, the evaluation ratings of one station are not directly comparable with those of another station. For example, an area may produce low protein wheats which give large and plump kernels, good milling and kernel characteristics, but low protein and unsatisfactory baking properties such as short mixing time, low loaf volume and weak dough characteristics. The wheat from this area could not be considered as a strong spring wheat and would not maintain the quality expected from the spring wheat producing area. A good variety should have tolerance to a wide range of environmental conditions and the overall picture should be taken into consideration for establishing these varieties.

Kernel Characteristics are important in determining the initial value of the wheat and, if extremely poor, could disqualify a new variety from further consideration. Because of the present grading system, it is desirable to have a good test weight. If a sample has a low 1000 kernel weight and small kernel size distribution, it would be considered a poor sample for milling because of the high ratio of bran to endosperm. Therefore, it is desirable to have plump kernels. Wheat ash is an important factor when comparing a variety against other standard varieties. If a sample consistently has higher wheat mineral content, it increases the probability of having high flour ash. Lower protein than the standard varieties is not desirable, because in a low protein crop year the probability of it having such a low protein as to be undesirable is much greater. Therefore, the protein must also be considered as a characteristic when comparing varieties grown in the same locality.

Milling Performance is very important, especially the subcategory of milling characteristics. If low extraction or high flour ash is obtained, these become major factors which are quite unacceptable from a commercial milling standpoint. All flour mineral contents are reported at a constant extraction of 65%, so that the figures are directly comparable. As a rule of thumb, one can approximate that each point of ash (0.01%) is equivalent to approximately 2% in extraction.

Milling characteristics are important. A sample which tends to be soft in character requires a different milling technique to be milled properly. On commercial mills flowed for hard vitreous spring wheats, soft milling characteristics cause great difficulty. Therefore, if a sample shows softness in character, it is considered to be unsatisfactory. Likewise, a sample which is extremely hard and vitreous will cause difficulty. Both types of wheat (soft and vitreous) require different roll pressures, clothing, sifter surface and temper to be milled properly. If these wheats are blended with normal milling wheats, improper results are obtained since these characteristics are not necessarily compatible or additive. Normal to soft score indicates that the sample shows a tendency toward softness of character on the flour mill stocks and extraction. This would indicate that the sample may give some difficulty for certain mill streams, and an adjustment would either have to be made in the milling flow or in tempering procedures to compensate for these differences. The properties of this wheat may or may not be compatible with other wheats with which it may be blended; therefore, it is important to maintain varieties with milling characteristics as uniform as possible.

The amount of protein recovered in the flour for a sample is of importance. High protein wheats yielding low protein flours are not desirable. Such a wheat would have much of the protein distributed in the outer portion of the kernel which would result in excessive protein in the feed. Therefore, higher wheat protein would be necessary to yield a flour with protein content comparable to that of a wheat that gives good flour protein recovery.

Mixogram Patterns and Farinogram Patterns are important in estimating the strength and mixing tolerance or potential mixing tolerance of a flour. A long, flat curve is more desirable than a short, peaked curve; however, an extremely long curve may be undesirable, if the flour would require excessive mixing for proper development. Both the pattern and length of the curve are important, and both must be considered. Abnormal curves, such as sway-back or long initial time to incorporate the water, indicate undesirable characteristics.

Baking Evaluation takes into account the flour absorption, mixing time, dough characteristics, loaf volume and machinability. A sample which has low absorption would be unsatisfactory. A sample with extremely short mixing time would also be considered undesirable as a good strong spring wheat. When a sample is in the minimal range for these values, it is considered to be questionable until further testing demonstrates whether a definite deficiency exists.

Doughs having mellow to weak dough properties show a tendency towards weakness. Also, for mellow to strong, the dough is mellow but has a tendency to be strong, and a strong to mellow dough is just the reverse. Since these characteristics are subjective rather than objective, it is necessary at times to estimate the tendency; therefore, the necessity exists for apparent double grades.

The grain or appearance of the interior of the loaf shows how well the sample stood up during baking and may point out or explain some deficiencies which have been observed during the baking test.

Loaf volume indicates potential strength of the flour in a different manner than mixing time or dough characteristics in that it shows the ability or lack thereof for the dough to expand under pressure and to contain the entrapped gases during this expansion. Weak flours act much like balloons, which burst when blown up and collapse and yield low loaf volume or yield an extremely large volume with large holes in the interior of the loaf. Low protein flours and lifeless (dead) doughs exhibit properties similar to putty and do not expand during fermentation or baking and give low loaf volume. Tough and very bucky doughs are bound too tightly and impede expansion of the gases causing low loaf volume.

General Evaluation rating applies only to the data contained in the year of the report. However, a summation of total and major deficiencies, and an average General Evaluation score for the number of years the sample has been tested are included in the discussion of individual varieties and selections of the Uniform Regional Nursery.

UNIFORM REGIONAL NURSERY SAMPLES - 1985 CROP

Discussion of Area Blends

A total of 605 Uniform Regional Nursery samples were received. However, only 575 wheat samples from 19 stations in 8 states were blended for this crop year by area. The areas tend to represent movement of the wheat in the market (See map, page 7). Kernel characteristics were determined on individual samples to eliminate possible erroneous results. The area blends were then milled and baked by our macro method. Thirty samples were received from each of the 19 stations. Twenty-five selections were included for quality evaluation in the Uniform Regional Nursery samples. The remainder of the samples were the commercially named varieties Butte, Chris, Era, Marquis and Waldron.

Data from the southeast area blend are given in Table 2. The six stations included in this blend were Brookings, Selby, Redfield, South Dakota; Madison, Wisconsin; Morris and St. Paul, Minnesota.

Data from the northeast area blend are given in Table 3. The five stations included in this blend were Carrington Irr., Fargo, Minot and Langdon, North Dakota and Crookston, Minnesota.

Data from the western area blend are given in Table 4. The eight stations included in this blend were Sidney and Bozeman, Montana; Dickinson and Williston, North Dakota; Aberdeen and Tetonia, Idaho; Sheridan, Wyoming; and Pullman, Washington. Williston, North Dakota submitted six extra samples. Havre, Montana samples were not included in the area blend because of the wheat characteristics. These samples were processed individually, and the data are reported in Tables 5 and 6.

Discussion of Area and Crop Year Averages

In Table 1 are given the average area results for the combined data of the varieties, Butte, Chris, Era and Waldron samples submitted from the 8 states and 19 stations. The area average represents all samples that were grown in that area for the year cited.

The milling and baking results were obtained from the area blend of the wheats in equal proportions from each of the stations for the respective variety or selection. The regular 100 g straight dough rich formula was used in

baking. The General Evaluation column includes the overall performance of the blend of each sample. The general evaluation given for the sample area blend may not agree with that of the individual wheat samples within the blend, since averages do not express the range, and poor characteristics may be masked. In an endeavor to clarify this problem, we have included in the discussion of the varieties and selections, the average general evaluation, the number of total deficiencies and the number of major deficiencies -- (Average General Evaluation - #Total Deficiencies/#Major Deficiencies).

Also given in Table 1 are comparisons of the previous five crop years, which include all selections grown in the Uniform Regional Nursery for that year, as well as the 5 YA. 1985 crop kernel characteristics (test weight and 1000 kernel weight) were better than the 5 YA. Bake absorption was 0.3% lower, and also the mixing time was slightly shorter than the 5 YA. The dough character and crumb grain was equal to the 5 YA. The loaf volume was slightly lower than the 5 YA.

The General Score of the 1985 and 1984 crop results shows the 1985 crop slightly better than the 1984 crop. The bake absorption was 0.9% lower than the 1984 crop, but the mix time was slightly shorter. Dough character, crumb color, crumb grain and loaf volume were equal. Test weight, 1000 KWT, large kernels, flour extraction and wheat protein were all better than the 1984 crop.

Discussion of Individual Varieties or Selections

For simplicity and brevity, as in previous reports, each selection or variety will be discussed from the general viewpoint rather than the individual areas.

Average results of the varieties Butte, Chris and Waldron for each of the individual areas were used as standards for the other selections from that area; therefore, a variety or selection may be rated satisfactory in two different areas, but comparison of the data may show much poorer results for one area due to adverse environmental conditions. Thus the sample with poor results could be rated as having unsatisfactory quality when compared with the overall spring wheat area, even though it may be rated as showing good promise for one area.

By using the same format as used in previous years and employment of the computer, all named varieties receive a

general evaluation. The word descriptions of these numerical scores are as follows: 1-1.4, no promise; 1.5-2.4, little promise; 2.5-3.4, some promise; 3.5-4.0, good promise. Only those varieties in the "Good Promise" category could be consistently considered as acceptable to the trade both in the domestic, as well as foreign markets. Data for the named varieties of Butte, Chris, Era, Marquis and Waldron will be an average of each variety for the last three years.

Butte	(3.3 - 19/11) 8/	- Some Promise
Chris	(3.9 - 15/4)	- Good Promise
Era	(2.9 - 34/14)	- Some Promise
Marquis	(3.1 - 30/11)	- Some Promise
Waldron	(3.8 - 12/6)	- Good Promise

ID 6291 (3.1 - 6/4) (1 yr.)

Faults:

Kernel Characteristics - Weight protein.

Milling Performance - Flour protein.

Baking Evaluation - Crumb grain.

General Evaluation - Some promise.

MN 80056 (3.1 - 19/5) (2 yrs.)

Faults:

Kernel Characteristics - Wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Bake absorption, mix time, crumb color, crumb grain.

General Evaluation - Some promise.

8/ (Average General Evaluation - # Total Deficiencies/Major Deficiencies)

MN 82047 (3.1 - 7/4) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Crumb grain.

General Evaluation - Crumb grain.

MN 82128 (2.9 - 22/7) (2 yrs.)

Faults:

Kernel Characteristics - Wheat protein, test weight.

Milling Performance - Flour protein.

Baking Evaluation - Bake absorption, mixograph score, mix time, dough character, crumb grain, loaf volume.

General Evaluation - Some promise.

MT 8218 (3.0 - 9/4) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Mixograph score, mix time, crumb grain.

General Evaluation - Some promise.

MT 8320 (3.3 - 7/3) (1 yr.)

Faults:

Kernel Characteristics - Small kernels, wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Dough character, crumb grain.

General Evaluation - Some promise.

MT 8328 (3.0 - 9/4) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein, small kernels.

Milling Performance - Flour protein.

Baking Evaluation - Mix time, crumb grain.

General Evaluation - Some promise.

NAHS 81-12 (3.1 - 21/6) (2 yrs.)

Faults:

Kernel Characteristics - Test weight, 1000 KWT, small kernels, wheat protein.

Milling Performance- Flour protein.

Baking Evaluation - Bake absorption, crumb color, crumb grain.

General Evaluation - Some promise.

NAHS 81-55 (3.5 - 16/2) (2 yrs.)

Faults:

Kernel Characteristics - Small kernels, wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Crumb color, crumb grain, loaf volume.

General Evaluation - Good promise.

NAHS 82-175 (3.0 - 7/4) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Crumb grain, loaf volume.

General Evaluation - Some promise.

NAHS 82-288 (3.7 - 4/1) (1 yr.)

Faults:

Kernel Characteristics - Test weight, wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Crumb grain.

General Evaluation - Good promise.

ND 597 (3.5 - 22/8) (3 yrs.)

Faults:

Kernel Characteristics - 1000 KWT, wheat protein, wheat ash, small kernels.

Milling Performance - Flour protein, flour extraction.

Baking Evaluation - Mix time, crumb color, crumb grain, loaf volume.

General Evaluation - Good promise.

ND 600 (3.6 - 4/3) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein.

Milling Performance - Satisfactory.

Baking Evaluation - Crumb grain.

General Evaluation - Good promise.

ND 604 (3.6 - 12/5) (2 yrs.)

Faults:

Kernel Characteristics - Wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Crumb color, crumb grain.

General Evaluation - Good promise.

ND 606 (3.4 - 5/4) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Crumb grain.

General Evaluation - Some promise.

ND 616 (3.5 - 8/2) (1 yr.)

Faults:

Kernel Characteristics - Test weight.

Milling Performance - Satisfactory.

Baking Evaluation - Mixograph score, mix time, crumb grain.

General Evaluation - Good promise.

RH 841246 (2.7 - 9/6) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Mix time, bake absorption, crumb grain.

General Evaluation - Some promise.

SD 2956 (3.0 - 22/6) (2 yrs.)

Faults:

Kernel Characteristics - Wheat protein, small kernels.

Milling Performance - Flour protein.

Baking Evaluation - Mixograph score, mix time, bake absorption, crumb color, crumb grain.

General Evaluation - Some promise.

SD 2962 (2.5 - 13/4) (1 yr.)

Faults:

Kernel Characteristics - Wheat protein.

Milling Performance - Flour extraction, flour protein.

Baking Evaluation - Mix time, crumb grain, loaf volume.

General Evaluation - Some promise.

SD 2968 (3.0 - 15/10) (2 yrs.)

Faults:

Kernel Characteristics - Small kernels, wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Crumb color, crumb grain, loaf volume.

General Evaluation - Some promise.

SD 8026 (3.5 - 20/6) (3 yrs.)

Faults:

Kernel Characteristics - Small kernels, wheat protein, wheat ash.

Milling Performance - Flour protein.

Baking Evaluation - Crumb color, crumb grain, loaf volume.

General Evaluation - Good promise.

SD 8036 (3.1 - 18/5) (2 yrs.)

Faults:

Kernel Characteristics - Wheat protein.

Milling Performance - Flour extraction, flour protein.

Baking Evaluation - Bake absorption, crumb grain.

General Evaluation - Some promise.

WA 7075 (3.1 - 20/8) (2 yrs.)

Faults:

Kernel Characteristics - Test weight, small kernels, wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Crumb color, crumb grain, loaf volume.

General Evaluation - Some promise.

WA 7182 (2.7 - 38/13) (2 yrs.)

Faults:

Kernel Characteristics - Test weight, 1000 KWT, small kernels, wheat protein.

Milling Performance - Flour extraction, ash at 65% extraction, flour protein.

Baking Evaluation - Mix time, crumb color, crumb grain.

General Evaluation - Some promise.

WA 7185 (3.1 - 20/7) (2 yrs.)

Faults:

Kernel Characteristics - Test weight, 1000 KWT, small kernels, wheat protein.

Milling Performance - Flour protein.

Baking Evaluation - Bake absorption, dough character, crumb grain, loaf volume.

General Evaluation - Some promise.

1985 UNIFORM REGIONAL HARD RED SPRING WHEAT NURSERY SAMPLES NOT INCLUDED IN THE AREA BLENDS

WILLISTON, NORTH DAKOTA

Six varieties were received from this station - Alex, Glenman, Len, Lew, Stoa and PR 2369. Len variety was used as the standard. The data for these samples are given in Table 5.

HAVRE, MONTANA

This station was not included in the area blends because of kernel characteristics. The varieties used as standards were Butte, Chris and Waldron. The data for these samples are given in Table 6.

FIELD PLOT NURSERY SAMPLES - 1985 CROP

Thirty-five samples were received from two states at four stations. The data for the individual samples are given in Tables 7-10.

MESA - ARIZONA

Sixteen samples were received from this station using Yecora Rojo as the standard. The data for these samples are given in Table 7. The average general score for this station was 2.2.

MINOT, LANGDON, FARGO - NORTH DAKOTA

Seven named varieties were received from each of the two stations Minot and Langdon. Five named varieties were received from Fargo. Butte, Len and Waldron were used as the standards from Minot and Langdon, and Len was used as the standard from Fargo. The data for these three stations are given in Tables 8-10. The average general score is 3.6 for Minot, 3.5 for Langdon and 3.4 for Fargo.

EXPLANATION OF ABBREVIATIONS LISTED UNDER THE HEADINGS AND THOSE THAT MAY BE LISTED UNDER MINOR AND MAJOR DEFICIENCIES ON COMPUTER PRINTOUT

TW = Test Weight
KW = 1,000 Kernel Weight
LG = Large Kernels
SM = Small Kernels

WM = Wheat Mineral
WP = Wheat Protein
EX = Flour Extraction
M65 = Mineral at 65% Flour Extraction

FP; FLR PRO = Flour Protein
MC; MLG CHAR = Milling Characteristics
MLG PER = Milling Performance
MIX ABS = Mixograph Absorption

MX; MIX PAT = Mixograph Pattern Score
BA; BAKE ABS = Actual Bake Absorption
MT; MIX TIME = Actual Dough Mixing Requirements

DC; DOUGH CHAR = Dough Handling Characteristics
CC; CRUMB COLOR = Example - 100 5
100 = Score received for brightness of the crumb grain
5 = Creamy-the color characteristic of that particular loaf (only the second score is faulted)

CG; CRUMB GRAIN = Example - 86 5
86 = Score received for crumb grain
5 = Open-or characteristic of that loaf's crumb grain (only the second score is faulted)

LV; LOAF VOL = Loaf Volume

FOOTNOTES FOR TABLES

These footnotes are applicable for specified column headings in all tables that follow

Column Heading	Footnote
TEST WT	Clean dry - Subtract 1 lb/bu for dockage-free TW.
WHT ASH, WHT PRO, ASH @ 65%, FLR PRO, BAKE ABS (100 g loaf)	14% Moisture basis.
MILL CHAR	5 = Normal. 4 = Normal-soft. 3 = Soft-normal. 2 = Soft. 1 = Gritty. 0 = Very soft.
MIX PAT	Refer to reference mixograms for numerical curve pattern. (1 = Very weak - - - 11 = Very strong.)
DOUGH CHAR	9 = Elastic. 8 = Slightly elastic. 7 = Slightly pliable. 6 = Pliable. 5 = Very pliable. 4 = Very elastic. 3 = Bucky. 2 = Very, very pliable. 1 = Extremely pliable. 0 = Dead.
CRUMB COLOR	First column: A realistic score of brightness compared with a 1984 ND standard scored as 100. Second column: 9 = Bright white. 8 = White. 7 = Normal. 6 = Slightly creamy. 5 = Bright creamy. 4 = Creamy. 3 = Very creamy. 2 = Gray. 1 = Very gray. 0 = Dull.
CRUMB GRAIN	First column: A relative overall crumb grain score as compared with a 1984 ND standard scored as 90. Second column: 12 = Normal. 11 = Slightly irregular. 10 = Slightly open. 9 = Slightly irregular and slightly open. 8 = Slightly open and slightly irregular. 7 = Irregular. 6 = Open. 5 = Irregular and slightly open. 4 = Open and slightly irregular. 3 = Irregular and open. 2 = Open and irregular. 1 = Harsh. 0 = Soggy.

QUALITY DATA OF UNIFORM REGIONAL BLENDS

AREA AND CROP-YEAR AVERAGES

TABLE 1

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG %	SIZING SM %	WHT ASH %	WHT PRO %	WHEAT SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	MIX ABS %	MIX PAT
***WESTERN AREA ***															
BUTTE	S	60.3	28.4	12	4	1.55	15.2	4	69.2	0.33	14.2	4	4	64.7	4
CHRIS	S	58.7	25.9	9	6	1.58	16.1	4	67.8	0.36	15.1	4	4	64.2	4
ERA		59.8	27.6	16	6	1.55	14.2	4	70.1	0.36	13.4	5	4	62.5	5
WALDRON	S	58.5	29.4	26	4	1.64	15.4	4	68.7	0.38	14.5	4	4	63.2	5
AREA AVERAGE		59.4	29.1	18	5	1.57	15.1	4	69.1	0.37	14.2	4	4	65.0	5
***NORTHEASTERN AREA ***															
BUTTE	S	63.2	35.3	56	1	1.53	13.2	3	72.0	0.32	12.4	5	2	65.3	4
CHRIS	S	62.6	32.0	38	1	1.58	14.3	4	70.5	0.34	13.3	5	4	66.0	4
ERA		63.0	32.4	45	1	1.54	12.1	2	72.2	0.36	11.1	5	2	62.5	4
WALDRON	S	61.1	37.0	69	1	1.57	14.0	4	71.4	0.37	13.1	5	4	64.7	4
AREA AVERAGE		62.2	35.9	53	1	1.59	13.2	3	71.3	0.34	12.2	5	2	63.9	4
***SOUTHEASTERN AREA ***															
BUTTE	S	62.0	31.4	22	1	1.58	13.6	3	72.6	0.36	12.7	5	3	65.7	4
CHRIS	S	61.8	29.1	13	3	1.67	14.7	4	70.5	0.36	13.4	5	4	64.4	3
ERA		62.0	30.1	19	3	1.62	12.9	2	72.0	0.36	11.8	5	2	62.5	4
WALDRON	S	60.4	32.8	36	2	1.72	14.3	4	71.6	0.39	13.5	5	4	63.8	5
AREA AVERAGE		60.9	32.2	28	3	1.68	13.7	3	71.3	0.36	12.7	5	3	64.1	4
***CROP-YEAR AVERAGES ***															
1981 AVERAGE		58.9	29.9	23	5	1.66	14.2	4	69.5	0.39	13.3	5	4	64.1	7
1982 AVERAGE		59.9	32.2	36	4	1.68	14.7	4	70.5	0.38	13.9	5	4	65.9	5
1983 AVERAGE		59.4	30.6	19	4	1.81	14.7	4	68.8	0.39	13.7	5	4	64.0	5
1984 AVERAGE		60.0	31.5	30	5	1.66	13.7	3	69.9	0.39	13.0	5	4	62.7	5
1985 AVERAGE		60.8	32.4	33	3	1.62	14.0	4	70.6	0.36	13.0	5	4	64.3	4
1981-85 AVG	S	59.8	31.3	28	4	1.69	14.3	4	69.9	0.38	13.4	5	4	64.2	5

QUALITY DATA OF UNIFORM REGIONAL BLENDS

TABLE 1 (Cont.) AREA AND CROP-YEAR AVERAGES

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	DEFICIENCIES TW	KW	SM	WA	WP	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG	LV
***WESTERN AREA ***																									
BUTTE	S	65.0	3.00	8	101 8	89 11	875	4	4.0																
CHRIS	S	64.2	4.00	8	101 8	88 8	825	4	4.0														MI		
ERA		62.5	3.50	9	101 8	89 11	920	4	4.0																
WALDRON	S	63.3	3.50	9	100 7	88 9	895	4	4.0																
AREA AVERAGE		65.2	3.75	8	101 7	88 6	894	4	4.0														MI		
***NORTHEASTERN AREA ***																									
BUTTE	S	65.0	3.50	8	100 7	89 9	815	4	3.0				MI			MJ									
CHRIS	S	65.4	3.50	8	101 7	90 11	840	4	4.0		MI														
ERA		62.5	4.00	8	101 6	89 6	835	4	2.7		MI		MJ			MJ						MI	MI		
WALDRON	S	64.5	3.25	8	99 7	90 12	835	4	4.0																
AREA AVERAGE		63.8	3.75	8	100 7	88 7	842	4	3.0				MI			MJ							MI		
***SOUTHEASTERN AREA ***																									
BUTTE	S	65.4	3.50	8	100 7	87 3	865	3	3.0				MI			MI							MJ		
CHRIS	S	64.0	3.50	9	100 8	88 3	920	3	3.7														MJ		
ERA		62.6	3.75	8	101 8	88 4	830	2	2.0				MJ			MJ							MJ	MI	
WALDRON	S	64.0	4.00	8	100 8	87 3	885	3	3.7														MJ		
AREA AVERAGE		64.2	4.25	8	100 7	88 5	890	4	3.3				MI			MI							MI		
***CROP-YEAR AVERAGES ***																									
1981 AVERAGE		65.0	5.00	9	101 6	87 2	907	3	3.7									MI				MI	MJ		
1982 AVERAGE		66.5	4.25	7	101 7	88 6	853	4	4.0														MI		
1983 AVERAGE		64.3	4.25	8	101 7	88 6	926	4	4.0														MI		
1984 AVERAGE		63.5	4.25	8	101 6	88 7	872	4	3.7				MI									MI	MI		
1985 AVERAGE		64.4	4.00	8	101 7	88 6	876	4	4.0														MI		
1981-85 AVG	S	64.7	4.25	8	101 7	88 5	887	4	4.0														MI		

QUALITY DATA OF SPRING WHEAT SAMPLES 1985 CROP

STATE=REGIONAL BLENDS STATION=SOUTHEASTERN AREA NURSERY=UNIFORM

TABLE 2

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG %	SIZING SM %	WHT ASH %	WHT PRO %	WHEAT SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	MIX ABS %	MIX PAT
BUTTE	S	62.0	31.4	22	1	1.58	13.6	3	72.6	0.36	12.7	5	3	65.7	4
CHRIS	S	61.8	29.1	13	3	1.67	14.7	4	70.5	0.36	13.4	5	4	64.4	3
ERA		62.0	30.1	19	3	1.62	12.9	2	72.0	0.36	11.8	5	2	62.5	4
MARQUIS		60.2	30.1	15	3	1.68	13.5	3	71.0	0.40	12.7	5	3	63.5	3
WALDRON	S	60.4	32.8	36	2	1.72	14.3	4	71.6	0.39	13.5	5	4	63.8	5
ID 6291		59.7	29.8	20	4	1.66	13.2	3	71.2	0.36	12.9	5	3	63.2	5
MN 80056		61.8	36.4	36	2	1.67	13.9	3	71.9	0.34	13.3	5	4	62.3	3
MN 82047		61.4	33.8	36	3	1.68	13.2	3	72.7	0.36	12.1	5	2	61.9	4
MN 82128		60.7	37.6	61	2	1.65	13.0	3	72.2	0.38	11.7	5	2	62.8	3
MT 8218		59.2	31.2	22	4	1.74	13.7	3	71.1	0.37	12.2	5	2	64.2	6
MT 8320		59.0	29.4	6	6	1.70	14.0	4	69.5	0.39	13.3	4	4	62.8	5
MT 8328		60.6	29.6	7	4	1.66	13.6	3	71.2	0.38	12.8	5	3	64.2	6
NAHS 81-12		60.6	27.7	14	5	1.77	13.3	3	71.1	0.37	12.5	5	3	63.2	5
NAHS 81-55		61.4	33.1	38	2	1.73	13.9	3	72.0	0.37	12.8	5	3	64.7	5
NAHS 82-175		62.7	37.3	45	2	1.63	12.5	2	71.9	0.33	11.4	5	2	64.2	5
NAHS 82-288		60.2	30.2	31	2	1.74	14.2	4	72.8	0.35	13.0	5	4	64.4	4
ND 597		61.7	35.1	49	1	1.67	14.1	4	70.8	0.35	13.1	5	4	66.6	4
ND 600		62.3	31.8	15	1	1.68	14.5	4	71.6	0.35	13.9	5	4	64.4	5
ND 604		61.9	33.2	39	2	1.66	14.8	4	72.3	0.35	14.1	5	4	65.3	5
ND 606		62.0	31.9	30	2	1.57	14.4	4	72.0	0.35	13.3	5	4	65.3	4
ND 616		60.2	32.1	36	1	1.77	14.8	4	71.1	0.32	14.2	5	4	66.0	7
RH 841246		61.6	31.5	22	4	1.70	13.0	3	72.5	0.34	12.4	5	2	62.8	4
SD 2956		61.6	32.6	29	2	1.67	13.3	3	71.2	0.34	11.8	5	2	63.5	3
SD 2962		62.2	35.9	32	2	1.68	13.6	3	68.1	0.36	11.9	4	1	62.5	3
SD 2968		62.4	36.6	43	2	1.59	12.9	2	72.8	0.32	11.5	5	2	64.7	4
SD 8026		61.4	35.9	45	2	1.69	13.8	3	72.2	0.35	12.4	5	2	64.7	4
SD 8036		62.0	33.5	42	1	1.64	13.8	3	69.4	0.34	12.7	4	2	64.2	4
WA 7975		58.7	32.9	30	3	1.67	13.5	3	71.2	0.37	12.9	5	3	65.3	5
WA 7182		56.0	25.9	4	11	1.93	14.0	2	68.6	0.49	13.3	4	3	66.3	6
WA 7185		58.3	27.6	4	5	1.72	13.2	3	71.0	0.40	12.5	5	3	62.8	5

QUALITY DATA OF SPRING WHEAT SAMPLES 1985 CROP

STATE=REGIONAL BLENDS STATION=SOUTHEASTERN AREA NURSERY=UNIFORM

TABLE 2 (Cont.)

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR		CRUMB GRAIN		LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	DEFICIENCIES TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG	LV
BUTTE	S	65.4	3.50	8	100	7	87	3	865	3	3.0				MI			MI							MJ	
CHRIS	S	64.0	3.50	9	100	8	88	3	920	3	3.7														MJ	
ERA		62.6	3.75	8	101	8	88	4	830	2	2.0				MJ			MJ							MJ	MI
MARQUIS		64.1	4.25	7	101	8	88	4	810	2	2.7				MI			MI							MJ	MI
WALDRON	S	64.0	4.00	8	100	8	87	3	885	3	3.7														MJ	
ID 6291		63.4	4.75	8	100	7	87	3	880	3	3.0				MI			MI							MJ	
MN 80056		62.6	2.75	7	100	4	88	9	870	3	3.3				MI							MI	MI			
MN 82047		62.6	5.00	8	100	7	89	6	840	4	3.0				MI			MJ							MI	
MN 82128		63.5	3.00	7	101	8	89	8	835	3	2.7				MI			MJ							MI	MI
MT 8218		64.5	7.00	8	100	8	89	7	840	3	2.7				MI			MJ				MI			MI	
MT 8320		63.5	5.00	9	102	8	89	6	945	4	4.0														MI	
MT 8328		64.4	6.00	9	102	8	88	4	900	2	2.7				MI			MI				MI			MJ	
NAHS 81-12		63.9	3.75	9	100	7	87	4	925	3	3.0		MI		MI			MI							MJ	
NAHS 81-55		64.5	4.25	9	100	4	89	11	925	4	3.3				MI			MI					MI			
NAHS 82-175		64.3	4.00	8	100	7	88	7	850	4	2.7				MJ			MJ							MI	
NAHS 82-288		64.0	3.00	9	101	7	86	3	925	3	3.7														MJ	
ND 597		66.2	3.25	8	101	8	88	4	870	3	3.7														MJ	
ND 600		64.2	3.75	9	99	7	86	3	995	3	3.7														MJ	
ND 604		64.6	4.75	9	100	7	89	6	980	4	4.0														MI	
ND 606		64.9	3.50	9	99	7	88	4	925	3	3.7														MJ	
ND 616		65.6	6.50	9	100	8	87	3	895	2	3.3									MI		MI			MJ	
RH 841246		63.2	4.00	8	102	7	86	4	885	3	2.7				MI			MJ							MJ	
SD 2956		64.0	3.25	8	100	7	87	8	895	4	3.0				MI			MJ							MI	
SD 2962		63.3	2.75	8	99	7	86	3	830	1	1.7				MI	MI		MJ				MI			MJ	MI
SD 2968		64.9	3.75	8	102	4	84	3	835	2	2.0				MJ			MJ					MI		MJ	MI
SD 8026		64.5	3.50	9	100	7	89	6	905	4	3.0				MI			MJ							MI	
SD 8036		64.4	3.25	9	101	8	88	4	915	3	2.7				MI	MI		MI							MJ	
WA 7075		65.1	4.25	9	100	7	88	4	955	3	3.0				MI			MI							MJ	
WA 7182		66.4	6.00	9	99	4	89	6	900	3	2.7	MJ	MJ	MI		MI	MI					MI	MI	MI		
WA 7185		63.6	4.50	9	100	7	89	6	880	4	3.3		MI		MI			MI							MI	

DEFICIENCIES	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (MT)		DC	CC	CG	LV
MINOR FAULTING VALUES	57.9	29.0	8	13.9	69.5	.47	12.9	3	2.7-8	61.9	5.75-8.00	2.00-2.75	6	6	8	835
MAJOR FAULTING VALUES	56.9	26.0	18	12.9	67.5	.51	12.4	2	1.9-11	60.4	UNDER 1.75	OVER 8.00	4	3	4	785

*** 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

QUALITY DATA OF SPRING WHEAT SAMPLES 1985 CROP

STATE=REGIONAL BLENDS STATION=NORTHEASTERN AREA NURSERY=UNIFORM

TABLE 3

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG %	SIZING SM %	WHT ASH %	WHT PRO %	WHEAT SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	MIX ABS %	MIX PAT
BUTTE	S	63.2	35.3	56	1	1.53	13.2	3	72.0	0.32	12.4	5	2	65.3	4
CHRIS	S	62.6	32.0	38	1	1.58	14.3	4	70.5	0.34	13.3	5	4	66.0	4
ERA		63.0	32.4	45	1	1.54	12.1	2	72.2	0.36	11.1	5	2	62.5	4
MARQUIS		61.9	31.0	36	1	1.55	13.2	3	69.3	0.40	12.4	4	2	63.5	4
WALDRON	S	61.1	37.0	69	1	1.57	14.0	4	71.4	0.37	13.1	5	4	64.7	4
ID 6291		61.6	35.0	39	1	1.70	12.5	2	71.5	0.33	11.8	5	2	62.8	4
MN 80056		62.8	39.6	65	5	1.67	13.0	3	72.3	0.33	12.4	5	2	63.2	3
MN 82047		63.2	37.9	62	1	1.56	12.3	2	73.2	0.35	11.6	5	2	62.8	4
MN 82128		61.7	41.4	77	1	1.54	12.5	2	72.5	0.36	11.3	5	2	61.9	2
MT 8218		60.6	34.0	41	1	1.65	12.9	2	70.5	0.38	11.9	5	2	63.2	5
MT 8320		61.0	32.8	24	2	1.59	13.1	3	70.3	0.36	12.4	5	2	63.2	5
MT 8328		62.3	33.8	30	2	1.57	12.7	2	70.3	0.35	12.0	5	2	63.2	6
NAHS 81-12		63.1	31.7	35	1	1.62	12.2	2	72.9	0.35	11.3	5	2	63.2	3
NAHS 81-55		62.7	36.1	68	1	1.62	13.7	3	71.0	0.35	12.4	5	2	65.0	5
NAHS 82-175		63.5	42.6	76	1	1.54	11.8	2	71.7	0.32	11.2	5	2	64.2	4
NAHS 82-288		61.7	33.7	58	1	1.62	13.7	3	73.2	0.32	12.6	5	3	65.3	4
ND 597		62.4	39.2	74	1	1.54	13.9	3	70.5	0.33	12.7	5	3	67.0	5
ND 600		62.8	34.0	27	1	1.59	13.8	3	72.1	0.33	13.3	5	4	65.3	6
ND 604		62.5	37.1	72	1	1.55	14.5	4	71.4	0.32	13.6	5	4	66.0	5
ND 606		62.7	35.5	58	1	1.50	13.6	3	70.9	0.32	12.4	5	2	66.0	5
ND 616		61.3	37.4	71	1	1.70	14.7	4	70.1	0.31	13.8	5	4	64.4	7
RH 841246		63.0	35.3	52	1	1.61	12.5	2	72.6	0.33	11.8	5	2	61.3	4
SD 2956		62.7	36.9	60	1	1.53	12.5	2	72.9	0.29	11.4	5	2	61.3	2
SD 2962		64.0	38.5	58	1	1.58	13.6	3	67.9	0.35	12.0	4	1	62.5	3
SD 2968		63.6	40.8	69	1	1.52	12.7	2	73.5	0.29	11.7	5	2	64.2	4
SD 8026		62.5	38.3	66	1	1.58	13.5	3	72.1	0.32	12.6	5	3	64.2	5
SD 8036		62.7	37.3	69	1	1.60	13.6	3	69.3	0.32	12.4	4	2	64.7	4
WA 7075		61.2	39.1	63	1	1.57	12.7	2	71.7	0.34	11.9	5	2	64.2	4
WA 7182		57.2	28.2	8	6	1.84	13.3	2	68.0	0.43	12.4	4	1	65.0	5
WA 7185		60.2	32.1	30	2	1.65	12.4	2	70.5	0.38	11.8	5	2	61.9	4

QUALITY DATA OF SPRING WHEAT SAMPLES 1985 CROP

STATE=REGIONAL BLENDS STATION=NORTHEASTERN AREA NURSERY=UNIFORM

TABLE 3 (Cont.)

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	DEFICIENCIES TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG	LV
BUTTE	S	65.0	3.50	8	100 7	89 9	815	4	3.0				MI			MJ								
CHRIS	S	65.4	3.50	8	101 7	90 11	840	4	4.0		MI													
ERA		62.5	4.00	8	101 6	89 6	835	4	2.7		MI		MJ			MJ						MI	MI	
MARQUIS		63.0	4.00	8	100 7	89 7	785	4	3.0		MI		MI			MJ							MI	
WALDRON	S	64.5	3.25	8	99 7	90 12	835	4	4.0															
ID 6291		62.2	4.00	8	101 7	90 11	825	4	2.7				MJ			MJ								
MN 80056		62.6	2.50	8	99 4	89 9	820	3	2.7				MI			MJ				MI		MI		
MN 82047		62.2	4.00	8	100 8	89 5	835	4	2.7				MJ			MJ							MI	
MN 82128		61.9	2.75	7	100 8	88 3	760	1	1.7				MJ			MJ		MI	MI	MI			MJ	MI
MT 8218		62.4	5.50	7	100 7	87 3	785	3	2.3				MJ			MJ							MJ	
MT 8320		63.3	4.75	8	103 9	86 4	855	3	2.7				MI			MJ							MJ	
MT 8328		63.2	5.50	8	103 9	87 4	820	3	2.3				MJ			MJ							MJ	
NAHS 81-12		63.1	3.25	8	100 7	89 9	860	4	2.7		MI		MJ			MJ								
NAHS 81-55		64.9	4.75	8	100 4	88 7	870	4	3.0				MI			MJ						MI	MI	
NAHS 82-175		63.9	3.25	7	100 7	89 8	815	4	2.7				MJ			MJ							MI	
NAHS 82-288		65.2	4.00	8	100 7	89 9	855	4	3.3				MI			MI								
ND 597		66.8	2.75	8	100 7	88 4	815	2	2.7				MI			MI				MI			MJ	
ND 600		65.1	4.50	8	101 7	88 3	850	3	3.3				MI										MJ	
ND 604		65.7	3.75	9	101 6	86 4	890	3	3.7													MI	MJ	
ND 606		65.7	4.25	9	100 7	88 3	850	3	2.7				MI			MJ							MJ	
ND 616		64.2	5.50	8	100 7	88 5	845	4	4.0									MI					MI	
RH 841246		61.1	3.50	7	100 8	87 3	835	2	2.0				MJ			MJ			MI				MJ	
SD 2956		61.3	3.00	7	100 6	87 6	845	3	2.3				MJ			MJ		MI	MI			MI	MI	
SD 2962		62.7	2.75	7	100 7	87 4	855	2	2.0				MI	MI		MJ				MI			MJ	
SD 2968		64.1	3.75	8	100 8	89 11	900	4	2.7				MJ			MJ								
SD 8026		64.2	3.25	8	100 7	90 12	880	4	3.3				MI			MI								
SD 8036		64.8	3.25	9	100 8	89 8	895	4	3.0				MI			MJ							MI	
WA 7075		64.3	3.75	8	102 6	87 7	895	4	2.7				MJ			MJ						MI	MI	
WA 7182		65.5	4.50	7	100 3	87 7	850	3	2.0	MI	MJ		MI	MI		MJ						MJ	MI	
WA 7185		62.0	3.50	7	100 7	87 4	845	3	2.3		MI		MJ			MJ							MJ	

DEFICIENCIES	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (MT)		DC	CC	CG	LV
MINOR FAULTING VALUES	57.9	32.7	8	13.9	69.2	.47	12.9	3	2.7-8	61.9	5.75-8.00	2.00-2.75	6	6	8	775
MAJOR FAULTING VALUES	56.9	29.7	18	12.9	67.2	.51	12.4	2	1.9-11	60.4	UNDER 1.75	OVER 8.00	4	3	4	725

*** 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

QUALITY DATA OF SPRING WHEAT SAMPLES 1985 CROP

STATE=REGIONAL BLENDS STATION=WESTERN AREA NURSERY=UNIFORM

TABLE 4

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG %	SIZING SM %	WHT ASH %	WHT PRO %	WHEAT SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	MIX ABS %	MIX PAT
BUTTE	S	60.3	28.4	12	4	1.55	15.2	4	69.2	0.33	14.2	4	4	64.7	4
CHRIS	S	58.7	25.9	9	6	1.58	16.1	4	67.8	0.36	15.1	4	4	64.2	4
ERA		59.8	27.6	16	6	1.55	14.2	4	70.1	0.36	13.4	5	4	62.5	5
MARQUIS		59.4	29.3	20	4	1.59	15.6	4	67.2	0.34	15.4	5	4	63.5	3
WALDRON	S	58.5	29.4	26	4	1.64	15.4	4	68.7	0.38	14.5	4	4	63.2	5
ID 6291		58.5	27.8	7	6	1.65	14.7	4	68.6	0.36	13.7	4	4	65.0	6
MN 80056		59.9	32.8	21	4	1.53	14.9	4	69.2	0.35	14.0	4	4	62.5	4
MN 82047		60.3	29.6	20	3	1.55	14.1	4	71.2	0.37	13.4	5	4	61.9	5
MN 82128		59.0	31.6	33	4	1.64	15.0	4	68.8	0.38	14.0	4	4	63.8	4
MT 8218		58.8	29.4	15	6	1.57	15.0	4	68.6	0.40	14.1	4	4	63.8	7
MT 8320		58.5	28.7	11	9	1.55	15.4	4	68.8	0.38	14.3	4	4	63.5	6
MT 8328		59.5	28.7	15	9	1.55	15.3	4	69.0	0.36	14.2	4	4	63.2	6
NAHS 81-12		59.6	26.5	11	6	1.59	14.5	4	69.9	0.39	13.9	4	4	61.6	4
NAHS 81-55		59.9	30.3	25	9	1.58	14.9	4	69.9	0.39	13.9	5	4	62.5	5
NAHS 82-175		61.9	33.6	27	3	1.45	14.1	4	70.3	0.37	13.3	5	4	63.2	6
NAHS 82-288		57.8	27.4	18	5	1.58	15.1	4	70.3	0.35	13.8	5	4	67.0	5
ND 597		59.7	25.3	20	4	1.53	15.4	4	68.8	0.37	14.3	4	4	68.2	5
ND 600		60.0	27.4	5	4	1.55	15.7	4	69.4	0.36	15.0	4	4	67.6	5
ND 604		60.0	30.8	25	3	1.58	16.1	4	69.7	0.43	14.8	4	4	68.2	5
ND 606		59.4	29.0	19	4	1.47	15.6	4	68.5	0.37	14.8	4	4	67.9	4
ND 615		57.2	29.0	20	2	1.70	16.1	4	69.1	0.36	15.6	4	4	68.5	6
RH 84146		59.4	28.0	12	6	1.62	14.6	4	70.6	0.35	13.8	5	4	64.2	5
SD 2956		60.0	31.1	20	4	1.58	15.0	4	68.7	0.35	13.6	4	4	65.3	3
SD 2962		60.7	29.6	7	3	1.55	14.8	4	66.0	0.38	13.6	4	3	63.8	4
SD 2968		60.1	32.4	24	4	1.55	14.7	4	70.3	0.35	13.8	5	4	67.0	4
SD 8026		58.1	29.9	19	5	1.56	15.3	4	70.0	0.39	14.5	5	4	66.6	4
SD 8036		60.4	26.2	21	4	1.58	15.3	4	67.0	0.36	14.8	4	4	67.6	4
WA 7075		57.8	27.7	23	4	1.58	14.8	4	69.7	0.37	13.5	4	4	67.0	5
WA 7182		58.8	30.3	16	4	1.62	14.9	4	68.6	0.42	14.0	4	4	68.2	5
WA 7185		58.9	29.2	14	5	1.60	14.6	4	69.1	0.37	13.8	4	4	64.2	5

QUALITY DATA OF SPRING WHEAT SAMPLES 1985 CROP

STATE=REGIONAL BLENDS STATION=WESTERN AREA NURSERY=UNIFORM

TABLE 4 (Cont.)

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	DEFICIENCIES TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG	LV
BUTTE	S	65.0	3.00	8	101 8	89 11	875	4	4.0														MI	
CHRIS	S	64.2	4.00	8	101 8	88 8	825	4	4.0															
ERA		62.5	3.50	9	101 8	89 11	920	4	4.0															
MARQUIS		63.7	3.50	8	100 8	90 11	850	4	4.0															
WALDRON	S	63.3	3.50	9	100 7	88 9	895	4	4.0															
ID 6291		64.9	4.50	9	102 8	87 4	970	3	3.7														MJ	
MN 80056		62.4	2.75	8	101 7	88 3	875	2	3.3											MI			MJ	
MN 82047		62.0	3.50	9	102 8	88 4	885	3	3.7														MJ	
MN 82128		64.0	3.25	8	101 8	89 11	840	4	4.0															
MT 8218		63.9	4.50	9	101 8	88 7	850	4	4.0									MI					MI	
MT 8320		63.7	5.00	4	104 9	89 5	940	2	3.3			MI									MJ		MI	
MT 8328		63.4	4.00	9	103 9	88 7	885	4	4.0			MI											MI	
NAHS 81-12		61.8	4.00	8	102 8	88 6	870	3	3.7										MI				MI	
NAHS 81-55		62.6	3.50	8	100 7	89 6	860	4	4.0			MI											MI	
NAHS 82-175		63.1	4.00	8	100 7	90 12	800	3	3.7															MI
NAHS 82-288		67.2	3.50	9	100 7	90 11	895	4	4.0	MI														
ND 597		68.3	3.75	8	102 7	88 4	870	3	3.7		MI												MJ	
ND 600		67.6	4.25	9	102 7	86 3	975	3	3.7														MJ	
ND 604		68.4	3.00	8	100 4	85 3	900	3	3.7													MI	MJ	
ND 606		68.2	3.00	9	101 7	84 4	925	3	3.7														MJ	
ND 616		69.1	6.25	9	100 8	83 4	905	2	3.3	MI										MI			MJ	
RH 84146		64.7	5.75	9	101 8	88 3	905	2	3.3											MI			MJ	
SD 2956		65.6	2.25	9	100 7	88 7	965	3	3.7											MI			MI	
SD 2962		64.0	3.50	8	100 7	89 7	880	4	3.7					MI									MI	
SD 2968		67.1	3.25	9	102 8	83 3	950	3	3.7														MJ	
SD 8026		66.9	3.50	8	100 7	88 7	855	4	4.0														MI	
SD 8036		67.9	3.00	8	102 8	88 7	955	4	4.0														MI	
WA 7075		67.3	4.00	9	100 7	84 4	965	3	3.7	MI													MJ	
WA 7182		68.8	3.75	9	100 4	88 3	920	3	3.7													MI	MJ	
WA 7185		64.5	4.25	8	102 8	89 5	825	4	4.0														MI	

DEFICIENCIES	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (MI)		DC	CC	CG	LV
MINOR FAULTING VALUES	57.9	25.8	8	13.9	56.5	.47	12.9	3	2.7-8	61.9	5.75-8.00	2.00-2.75	6	6	8	810
MAJOR FAULTING VALUES	56.9	22.8	18	12.9	64.5	.51	12.4	2	1.9-11	60.4	UNDER 1.75	OVER 8.00	4	3	4	760

*** 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

QUALITY DATA OF SPRING WHEAT SAMPLES 1985 CROP

STATE=NORTH DAKOTA STATION=WILLISTON NURSERY=UNIFORM

TABLE 5

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG %	SIZING SM %	WHT ASH %	WHT PRO %	WHEAT SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	MIX ABS %	MIX PAT
ALEX		58.9	24.6	2	6	1.47	17.7	4	50.7	0.48	17.4	2	2	67.0	7
GLENMAN		56.6	25.9	4	4	1.56	16.2	3	51.2	0.51	15.5	2	2	63.5	11
LEN	S	58.9	27.9	5	3	1.49	17.8	4	50.5	0.51	16.5	2	2	66.6	7
LEW		55.7	27.2	3	4	1.58	17.2	3	51.0	0.45	17.0	2	2	64.2	8
STOA		57.6	24.8	3	8	1.50	17.2	4	52.4	0.45	17.0	2	2	67.0	8
2369		58.4	28.1	5	1	1.46	17.5	4	50.2	0.45	16.8	2	2	66.0	9

QUALITY DATA OF SPRING WHEAT SAMPLES 1985 CROP

STATE=NORTH DAKOTA STATION=WILLISTON NURSERY=UNIFORM

TABLE 5 (Cont.)

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	DEFICIENCIES TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG	LV
ALEX		67.0	6.50	8	101 7	87 4	196	2	2.7		MI						MJ	MI		MI				MJ
GLENMAN		63.5	17.75	3	100 7	89 8	190	1	2.0	MJ							MJ	MJ		MJ	MJ			MI
LEN	S	66.6	7.75	9	101 4	89 11	207	3	3.0								MJ	MI		MI		MI		
LEW		64.2	8.00	9	101 4	85 4	192	2	2.3	MJ							MJ	MI		MI		MI		MJ
STOA		67.0	8.00	8	101 7	87 3	204	2	2.7	MI	MI	MI					MJ	MI		MI				MJ
2369		66.0	8.25	4	103 9	87 7	212	1	2.3								MJ	MJ		MJ	MJ			MI

DEFICIENCIES	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (MT)		DC	CC	CG	LV
MINOR FAULTING VALUES	57.9	25.8	8	13.9	48.4	.57	12.9	3	2.7-8	61.9	5.75-8.00	2.00-2.75	6	6	8	186
MAJOR FAULTING VALUES	56.9	22.8	18	12.9	46.4	.61	12.4	2	1.9-11	60.4	UNDER 1.75	OVER 8.00	4	3	4	176

*** 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

QUALITY DATA OF SPRING WHEAT SAMPLES 1985 CROP

STATE=MONTANA STATION=HAVRE NURSERY=UNIFORM

TABLE 6

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG %	SIZING SM %	WHT ASH %	WHT PRO %	WHEAT SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	MIX ABS %	MIX PAT
BUTTE	S	52.0	20.1	1	19	1.45	17.3	2	58.3	0.44	16.4	4	4	63.5	8
CHRIS	S	48.3	16.3	0	37	1.71	18.7	2	54.4	0.57	18.0	2	2	66.0	6
ERA		49.9	18.3	0	37	1.77	17.1	2	57.7	0.55	16.4	3	3	67.6	6
MARQUIS		59.8	17.1	0	32	1.75	18.0	3	54.2	0.53	17.3	2	2	66.3	5
WALDRON	S	48.2	19.6	1	23	1.83	18.2	2	55.8	0.74	17.8	3	2	69.4	8
ID 06291		47.4	18.8	0	39	1.67	17.3	2	50.9	0.51	16.8	2	1	68.5	6
MN 80056		52.5	24.2	1	9	1.65	17.6	3	57.8	0.47	17.1	4	4	64.7	4
MN 82C47		49.6	20.5	1	22	1.70	17.5	2	57.1	0.53	16.5	4	4	67.6	6
MN 82128		49.1	21.9	1	12	1.69	17.7	3	53.7	0.53	16.7	2	1	65.0	4
MT 8218		49.0	20.2	0	24	1.59	17.8	2	52.1	0.59	16.7	2	1	67.0	8
MT 8320		50.2	19.6	0	35	1.56	18.1	2	50.7	0.51	17.2	2	1	66.6	7
MT 8328		50.1	19.0	0	43	1.64	18.0	2	51.9	0.54	17.6	2	1	67.6	7
NAHS 81-12		52.2	19.5	1	22	1.69	17.2	2	56.0	0.51	16.5	3	3	67.6	6
NAHS 81-55		49.0	21.1	1	21	1.74	17.5	2	53.3	0.65	16.2	2	1	67.9	6
NAHS 82-175		55.4	23.2	1	13	1.55	16.5	3	56.0	0.49	15.8	4	4	68.2	5
NAHS 82-288		49.1	18.9	0	26	1.70	17.6	2	56.7	0.52	17.1	4	4	67.0	6
ND 597		50.7	20.7	1	17	1.56	17.9	2	55.3	0.59	17.0	3	3	67.6	5
ND 600		51.4	19.6	0	25	1.59	17.9	2	55.6	0.51	17.2	3	3	67.6	8
ND 604		48.0	19.3	0	25	1.96	18.5	2	52.5	0.61	18.0	2	1	67.9	5
ND 606		51.7	21.5	1	13	1.54	17.5	3	56.0	0.50	16.3	4	4	65.3	4
ND 616		49.6	22.4	1	6	1.67	17.1	3	54.4	0.47	16.7	3	3	65.3	7
RH 841246		50.4	19.5	0	31	1.65	17.2	2	46.8	0.48	16.9	2	1	66.3	8
SD 2956		51.4	24.0	1	7	1.53	17.4	3	51.9	0.45	16.0	2	1	62.8	2
SD 2962		51.0	19.3	0	41	1.65	17.4	2	46.5	0.54	16.4	0	1	63.5	5
SD 2968		50.1	21.9	1	20	1.61	17.4	2	53.5	0.53	16.9	3	2	69.7	7
SD 8026		48.5	20.4	1	23	1.68	17.2	2	51.2	0.54	16.9	2	1	64.2	5
SD 8036		53.0	20.7	2	15	1.60	17.1	3	51.4	0.46	16.7	2	1	66.0	5
WA 7075		48.2	21.0	2	26	1.57	17.6	2	54.2	0.51	17.2	3	3	67.3	7
WA 7182		49.1	20.0	1	36	1.67	17.6	2	48.8	0.60	17.1	0	1	68.2	7
WA 7185		50.1	20.7	1	28	1.65	16.8	2	52.1	0.49	16.2	2	1	62.8	8

QUALITY DATA OF SPRING WHEAT SAMPLES 1985 CROP

STATE=MONTANA STATION=HAVRE NURSERY=UNIFORM

TABLE 6 (Cont.)

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	DEFICIENCIES TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG	LV
BUTTE	S	63.5	4.75	9	100 4	88 7	192	4	3.3	MJ		MJ						MI				MI	MI	
CHRIS	S	66.0	5.50	9	100 7	87 7	195	4	2.7	MJ	MI	MJ			MI		MJ						MI	
ERA		67.6	6.25	9	101 7	87 4	205	2	2.3	MJ		MJ					MI			MI			MJ	
MARQUIS		66.3	4.50	8	99 7	85 4	199	3	2.7			MJ					MJ						MJ	
WALDRON	S	69.4	10.75	9	99 4	87 3	205	1	1.7	MJ		MJ			MJ		MI	MI		MJ		MI	MJ	
ID 06291		68.5	6.50	9	100 7	88 3	222	2	1.7	MJ		MJ		MJ			MJ			MI			MJ	
MN 80056		64.7	3.50	8	102 7	89 9	201	4	3.7	MJ		MI												
MN 82047		67.6	6.50	9	103 9	90 13	214	3	3.0	MJ		MJ								MI				
MN 82128		65.0	4.00	8	100 4	90 12	200	4	2.7	MJ		MI		MI			MJ					MI		
MT 8218		67.0	10.75	9	101 7	87 7	194	2	1.7	MJ		MJ		MI	MI		MJ	MI		MJ				MI
MT 8320		66.6	8.50	9	104 9	87 4	223	1	1.3	MJ		MJ		MJ			MJ	MI		MJ				MJ
MT 8329		67.6	6.25	9	104 9	87 4	202	2	1.7	MJ		MJ		MJ			MJ	MI		MI				MJ
NAHS 81-12		67.6	8.00	9	104 9	86 4	213	2	2.3	MJ		MJ					MI			MI				MJ
NAHS 81-55		67.9	6.00	8	99 4	89 8	195	3	2.0	MJ		MJ		MI	MJ		MJ			MI		MI		MI
NAHS 82-175		68.2	5.25	8	101 8	86 4	190	3	3.3	MJ		MI												MJ
NAHS 82-288		67.0	8.75	9	99 7	84 4	205	1	2.3	MJ		MJ								MJ				MJ
ND 597		67.6	6.50	9	100 7	85 4	200	2	2.3	MJ		MJ			MI		MI			MI				MJ
ND 600		67.6	11.00	9	100 7	88 6	207	2	2.3	MJ		MJ					MI	MI		MJ				MI
ND 604		67.9	3.75	8	100 4	89 8	205	4	2.3	MJ		MJ		MI	MJ		MJ					MI		MI
ND 606		65.3	4.00	8	99 7	90 12	198	4	3.7	MJ		MI												
ND 616		65.3	7.50	8	101 8	90 11	179	3	3.0	MJ							MI	MI		MI				
RH 841246		66.3	11.25	9	101 8	86 4	210	1	1.3	MJ		MJ		MJ			MJ	MI		MJ				MJ
SD 2956		62.8	2.25	8	100 8	87 4	203	2	2.0	MJ				MJ			MJ	MI		MI				MJ
SD 2962		63.5	4.50	9	102 8	86 4	204	3	2.0	MJ		MJ		MJ			MJ							MJ
SD 2968		69.7	7.75	9	100 7	85 4	220	2	2.0	MJ		MJ		MI			MI	MI		MI				MJ
SD 8026		64.2	4.50	9	99 4	88 9	190	4	2.3	MJ		MJ		MJ			MJ					MI		
SD 8036		66.0	5.25	9	103 7	85 3	196	3	2.3	MJ		MI		MJ			MJ							MJ
WA 7075		67.3	6.50	9	102 4	86 3	206	2	2.3	MJ		MJ					MI	MI		MI		MI	MJ	
WA 7182		68.2	8.25	9	100 4	87 8	220	2	1.7	MJ		MJ		MJ	MI		MJ	MI		MJ		MI	MI	
WA 7195		62.8	7.00	9	102 8	87 8	193	3	2.0	MJ		MJ		MI			MJ	MI		MI				MI

DEFICIENCIES	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (MT)		DC	CC	CG	LV
MINOR FAULTING VALUES	57.9	16.6	8	13.9	54.1	.57	12.9	3	2.7-8	61.9	5.75-8.00	2.00-2.75	6	6	8	176
MAJOR FAULTING VALUES	56.9	13.6	18	12.9	52.1	.61	12.4	2	1.9-11	60.4	UNDER 1.75	OVER 8.00	4	3	4	166

*** 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

QUALITY DATA OF SPRING WHEAT SAMPLES 1985 CROP

STATE=ARIZONA STATION=MESA NURSERY=FIELD PLOTS

TABLE 7

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG %	SIZING SM %	WHT ASH %	WHT PRO %	WHEAT SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	MIX ABS %	MIX PAT
YECORA ROJO	S	62.0	40.3	39	3	1.56	14.7	4	69.3	0.43	13.4	4	4	65.7	6
PROBRAND 771		56.9	32.1	5	5	1.60	14.1	2	67.2	0.41	13.2	3	3	63.8	5
C79-268-1		58.5	34.6	20	4	1.68	13.4	2	64.2	0.49	12.2	3	1	64.4	6
I-45		62.4	33.3	29	5	1.44	12.5	1	66.8	0.43	10.8	3	1	64.2	5
I-455		60.3	34.5	18	5	1.69	13.5	2	68.1	0.38	12.0	4	2	62.8	4
I-518		60.6	32.7	18	6	1.56	12.8	1	64.4	0.46	11.5	3	1	66.6	4
I-522		60.4	37.3	8	6	1.51	12.8	2	67.0	0.42	11.5	3	1	67.6	4
I-531		61.2	37.0	33	3	1.80	14.3	4	67.5	0.42	13.4	4	4	68.5	6
I-572		63.7	35.3	15	2	1.40	12.7	2	67.1	0.42	11.7	3	1	62.8	2
IS-8322		63.0	38.8	22	3	1.48	12.6	2	66.4	0.40	11.3	3	1	65.0	5
IS-83501		63.7	40.0	47	1	1.36	12.2	2	67.7	0.42	11.3	3	1	62.3	3
LIP-40		63.1	38.6	15	5	1.52	12.2	2	66.2	0.42	11.2	3	1	63.5	5
P983-13		62.4	43.3	58	2	1.42	13.3	3	67.4	0.39	11.8	4	2	64.2	5
P983-29		62.8	36.6	17	4	1.46	14.0	4	68.3	0.40	12.9	4	3	67.6	6
P983-40		60.7	37.9	29	3	1.65	14.2	4	65.8	0.48	12.9	3	1	66.6	6
P983-63		59.6	34.0	10	5	1.59	14.3	3	63.3	0.50	12.9	3	1	65.3	5

QUALITY DATA OF SPRING WHEAT SAMPLES 1985 CROP

STATE=ARIZONA STATION=MESA NURSERY=FIELD PLOTS

TABLE 7 (Cont.)

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	DEFICIENCIES TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG	LV
YECORA ROJO	S	65.7	4.00	9	101 8	85 7	905	4	4.0														MI	
PROBRAND 771		64.1	4.25	9	101 8	89 11	900	4	3.0	MJ	MJ						MI							
C79-268-1		64.6	4.50	7	101 7	86 4	760	1	1.3		MJ		MI	MJ	MI	MJ	MI						MJ	MJ
I-45		64.3	4.25	2	102 7	84 4	675	1	1.0		MJ		MJ	MI		MJ	MI				MJ		MJ	MJ
I-455		62.7	3.25	8	102 8	89 7	865	4	2.7		MJ		MI			MJ							MI	
I-518		66.7	3.00	6	101 6	86 4	700	1	1.0		MJ		MJ	MJ		MJ	MI				MI	MI	MJ	MJ
I-522		67.8	2.25	6	100 6	85 3	725	1	1.3		MI		MJ	MI		MJ	MI			MI	MI	MI	MJ	MJ
I-531		68.4	3.50	9	101 6	88 7	960	4	4.0		MI											MI	MI	
I-572		63.4	2.50	2	100 4	86 4	655	1	1.3		MI		MJ	MI		MJ	MI	MI		MI	MJ	MI	MJ	MJ
IS-8322		65.3	4.25	6	101 8	86 8	735	2	1.7				MJ	MI		MJ	MI				MI		MI	MJ
IS-83501		62.6	2.75	2	100 4	85 1	630	1	1.3				MJ			MJ	MI			MI	MJ	MI	MJ	MJ
LIP-40		64.0	3.75	2	100 7	85 1	630	1	1.3				MJ	MI		MJ	MI				MJ		MJ	MJ
P983-13		64.4	4.50	8	102 6	85 4	860	3	2.7				MI			MJ						MI	MJ	
P983-29		67.7	4.75	8	100 8	87 7	855	4	3.7		MI					MI							MI	
P983-40		67.1	4.50	8	100 6	88 7	820	3	2.7		MI			MI	MI	MI	MI					MI	MI	MI
P983-63		65.8	4.25	6	100 6	85 4	700	1	1.7		MJ			MJ	MI	MI	MI				MI	MI	MJ	MJ

DEFICIENCIES	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (MT)		DC	CC	CG	LV
MINOR FAULTING VALUES	57.9	38.2	8	13.9	67.2	.47	12.9	3	2.7-8	61.9	5.75-8.00	2.00-2.75	6	6	8	850
MAJOR FAULTING VALUES	56.9	35.2	18	12.9	65.2	.51	12.4	2	1.9-11	60.4	UNDER 1.75	OVER 8.00	4	3	4	800

*** 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

QUALITY DATA OF SPRING WHEAT SAMPLES 1985 CROP

STATE=NORTH DAKOTA STATION=MINOT NURSERY=FIELD PLOTS

TABLE 8

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG %	SIZING SM %	WHT ASH %	WHT PRO %	WHEAT SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	MIX ABS %	MIX PAT
ALEX		62.7	36.8	57	1	1.65	15.1	4	69.1	0.37	14.7	4	4	68.2	6
BUTTE	S	61.0	32.5	36	2	1.60	14.4	4	69.6	0.32	13.3	4	4	66.0	5
COTEAU		62.1	33.3	46	1	1.67	15.7	4	71.6	0.36	14.9	5	4	70.0	6
LEN	S	61.3	35.3	54	1	1.52	14.6	4	71.9	0.35	13.5	5	4	67.0	7
MARSHALL		62.1	31.5	31	2	1.58	12.6	2	71.8	0.32	11.7	5	2	62.8	3
OLAF		59.5	32.8	31	2	1.65	14.5	4	68.9	0.34	13.2	4	4	64.7	6
WALDRON	S	59.4	36.0	30	1	1.66	14.4	4	69.3	0.37	13.5	4	4	65.7	5

QUALITY DATA OF SPRING WHEAT SAMPLES 1985 CROP

STATE=NORTH DAKOTA STATION=MINOT NURSERY=FIELD PLOTS

TABLE 8 (Cont.)

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	DEFICIENCIES TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG	LV
ALEX		68.3	3.75	9	100 8	88 7	915	4	4.0															MI
BUTTE	S	65.8	4.00	8	101 8	88 7	840	4	4.0															MI
COTEAU		70.0	3.00	9	102 8	87 3	915	3	3.7															MJ
LEN	S	67.1	5.50	8	101 4	87 4	865	3	3.7									MI				MI		MJ
MARSHALL		62.7	2.25	7	101 6	87 4	805	2	2.0		MI		MJ			MJ				MI		MI		MJ
OLAF		65.0	6.00	8	100 7	89 7	815	3	3.7											MI				MI
WALDRON	S	65.9	3.25	7	100 7	90 11	825	4	4.0															

DEFICIENCIES	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (MT)		DC	CC	CG	LV
MINOR FAULTING VALUES	57.9	32.5	8	13.9	68.2	.47	12.9	3	2.7.8	61.9	5.75-8.00	2.00-2.75	6	6	6	788
MAJOR FAULTING VALUES	56.9	29.5	18	12.9	66.2	.51	12.4	2	1.9-11	60.4	UNDER 1.75	OVER 8.00	4	3	4	738

*** 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

QUALITY DATA OF SPRING WHEAT SAMPLES 1985 CROP

STATE=NORTH DAKOTA STATION=LANGDON NURSERY=FIELD PLOTS

TABLE 9

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG %	SIZING SM %	WHT ASH %	WHT PRO %	WHEAT SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	MIX ABS %	MIX PAT
ALEX		60.5	36.4	54	1	1.53	14.3	4	71.3	0.36	13.8	5	4	65.3	5
BUTTE	S	62.1	38.6	67	1	1.36	13.9	3	72.5	0.31	13.5	5	4	65.7	4
COTEAU		60.6	34.0	42	1	1.56	15.3	4	73.4	0.38	14.5	5	4	67.6	5
LEN	S	59.7	37.7	69	1	1.52	14.2	4	72.8	0.35	13.4	5	4	66.0	7
MARSHALL		62.1	33.2	35	1	1.52	13.0	2	71.5	0.33	12.0	5	2	62.5	3
OLAF		61.4	42.0	75	1	1.47	14.4	4	70.9	0.30	12.9	5	3	63.2	6
WALDRON	S	60.0	38.8	72	1	1.52	14.8	4	70.2	0.34	13.5	5	4	64.7	4

QUALITY DATA OF SPRING WHEAT SAMPLES 1985 CROP

STATE=NORTH DAKOTA STATION=LANGDON NURSERY=FIELD PLOTS

TABLE 9 (Cont.)

VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	DEFICIENCIES TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG	LV
ALEX		66.2	3.75	9	100 7	88 7	920	4	4.0															MI
BUTTE	S	65.9	3.75	8	100 7	87 4	850	3	3.3				MI											MJ
COTEAU		67.5	3.25	9	101 8	88 8	965	4	4.0	MI														MI
LEN	S	66.4	6.00	9	100 4	87 4	905	2	3.3									MI		MI		MI		MJ
MARSHALL		62.4	2.75	8	100 7	89 8	840	3	2.3	MJ			MI			MJ				MI				MI
OLAF		63.4	5.50	8	102 8	89 11	850	4	3.7							MI								
WALDRON	S	64.7	3.50	9	101 8	88 9	900	4	4.0															

DEFICIENCIES	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (MT)		DC	CC	CG	LV
MINOR FAULTING VALUES	57.9	36.3	8	13.9	69.7	.47	12.9	3	2,7.8	61.9	5.75-8.00	2.00-2.75	6	6	8	830
MAJOR FAULTING VALUES	56.9	33.3	18	12.9	67.7	.51	12.4	2	1.9-11	60.4	UNDER 1.75	OVER 8.00	4	3	4	780

*** 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

QUALITY DATA OF SPRING WHEAT SAMPLES 1985 CROP

STATE=NORTH DAKOTA STATION=FARGO NURSERY=FIELD PLOTS

TABLE 10

VARIETY	STD	TEST WT #/BU	1000 K.WT G.	SIZING LG %	SIZING SM %	WHT ASH %	WHT PRO %	WHEAT SCORE ***	FLR EXT %	ASH @ 65%EX %	FLR PRO %	MILL CHAR	MILL SCORE ***	MIX ABS %	MIX PAT
ALEX		62.2	34.0	46	2	1.90	15.7	4	70.0	0.37	14.5	5	4	64.4	5
BUTTE		60.4	30.9	24	2	1.68	14.7	4	71.0	0.33	13.6	5	4	64.2	5
LEN	S	58.9	30.9	38	3	1.74	15.1	4	70.3	0.37	14.0	5	4	64.2	9
MARSHALL		61.4	31.5	38	2	1.74	13.7	3	72.9	0.35	12.5	5	3	61.9	4
WALDRON		57.2	30.0	30	2	1.94	16.0	4	69.0	0.40	14.8	4	4	64.2	5

QUALITY DATA OF SPRING WHEAT SAMPLES 1985 CROP

STATE=NORTH DAKOTA STATION=FARGO NURSERY=FIELD PLOTS

TABLE 10 (Cont.)

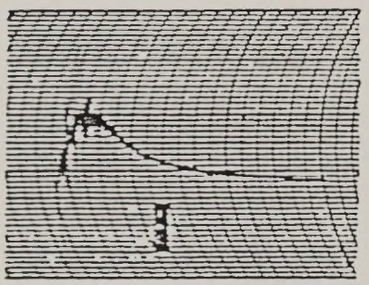
VARIETY	STD	BAKE ABS %	MIX TIME MIN	DOUGH CHAR	CRUMB COLOR	CRUMB GRAIN	LOAF VOL CC	BAKE SCORE ***	GENERAL SCORE ***	DEFICIENCIES TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MT	DC	CC	CG	LV
ALEX		64.2	3.75	9	101 8	88 6	925	4	4.0															MI
BUTTE		63.7	3.75	9	100 7	88 3	915	3	3.7															MJ
LEN	S	64.0	6.25	9	100 7	86 4	955	1	3.0									MJ		MI				MJ
MARSHALL		61.4	3.00	9	100 7	85 3	890	1	2.3			MI				MI			MI					MJ MI
WALDRON		64.0	4.25	9	100 7	90 12	920	4	4.0		MI													

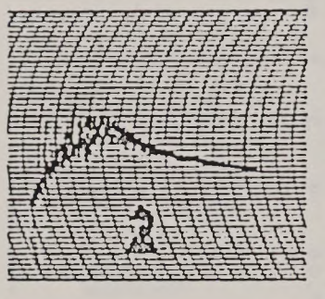
DEFICIENCIES	TW	KW	SM	WP	EX	A65	FP	MC	MX	BA	MIX TIME (MT)		DC	CC	CG	LV
MINOR FAULTING VALUES	57.9	28.8	8	13.9	68.2	.47	12.9	3	2.7.8	61.9	5.75-8.00	2.00-2.75	6	6	8	900
MAJOR FAULTING VALUES	56.9	25.8	18	12.9	66.2	.51	12.4	2	1.9-11	60.4	UNDER 1.75	OVER 8.00	4	3	4	850

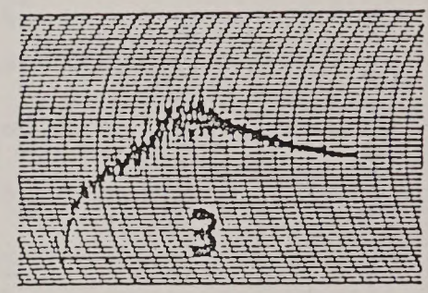
*** 1=NO PROMISE 2=LITTLE PROMISE 3=SOME PROMISE 4=GOOD PROMISE.

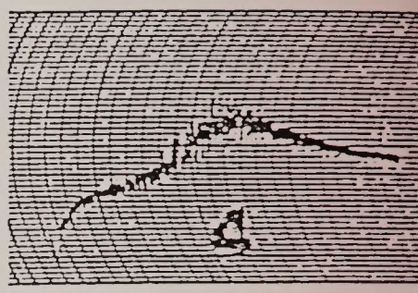
REFERENCE MIXOGRAMS

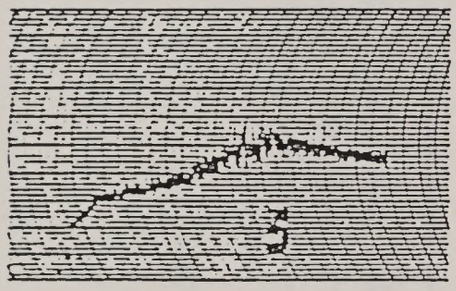
HARD RED SPRING WHEAT

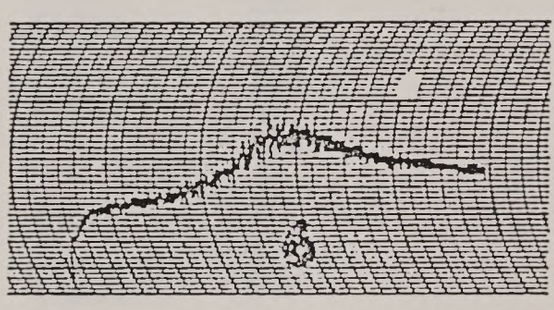


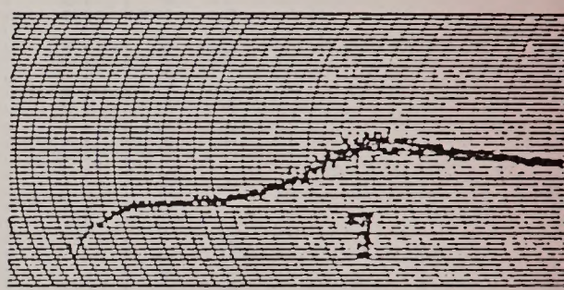


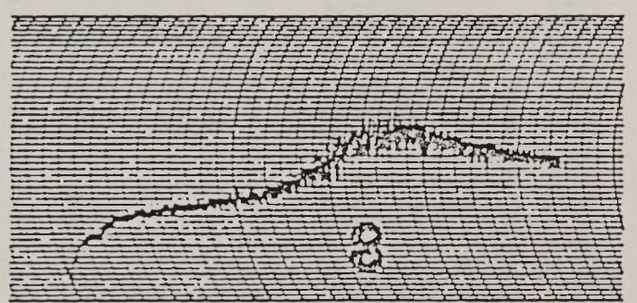


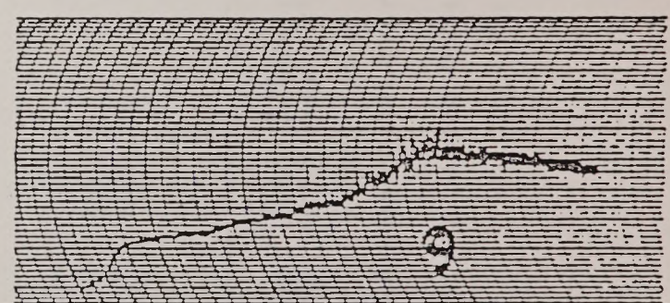


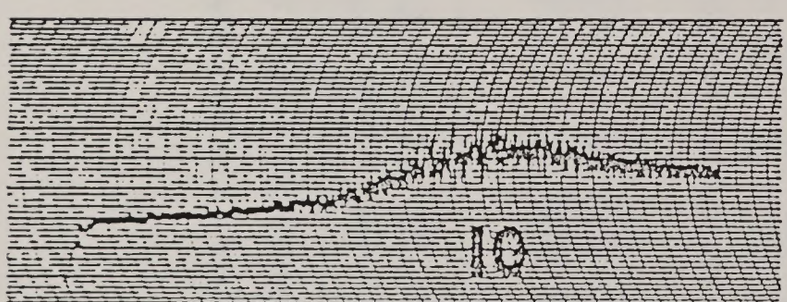


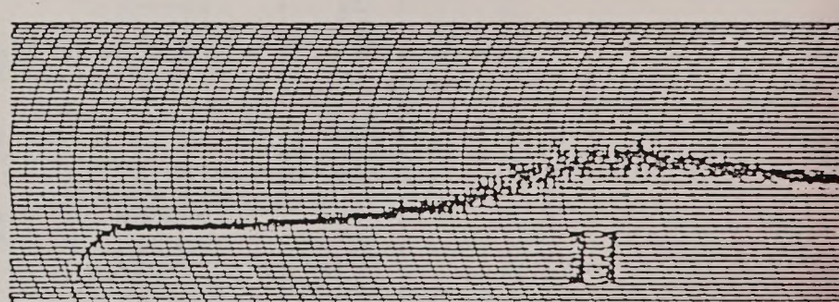












U.S.D.A. SPRING WHEAT QUALITY LABORATORY

FARGO, NORTH DAKOTA